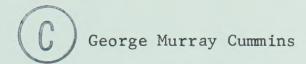THE UNIVERSITY OF ALBERTA

INCOME TAX CAPITALIZATION IN THE STOCK PRICES OF
SELECTED OIL AND GAS COMPANIES

by

(C) George Murray Cummins

A THESIS

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The undersigned certify that they have read, and
recommend to the Faculty of Graduate Studies for acceptance,
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ABSTRACT

This study tests empirically for evidence of income tax capitalization in the stock prices of selected oil and gas companies as a result of the discriminatory tax changes proposed by the government White Paper, <u>Proposals For Tax Reform</u>. The discussion is concerned primarily with widely-held oil and gas companies.

A general review of the existing tax legislation and the proposed changes with respect to the return from resource company stocks revealed that the return from these stocks was receiving harsher treatment from the White Paper than the return from other stocks. This is primarily due to the proposed gross up and credit provision, the taxation of capital gains and the removal of the shareholder depletion allowance.

Tax capitalization and tax diffusion are discussed with particular reference to stock prices and a model is developed, based on the above considerations, for the empirical testing of the theory of tax capitalization. A particular segment of the resource industry, the oil and gas industry, was selected for the test. If tax capitalization occurs, an increase in the tax burden should result in a decrease in stock price, <u>ceteris paribus</u>. Similarly a decrease in the tax burden should result in an increase in stock price.

The empirical testing of oil and gas stocks did not provide evidence to support the theory of tax capitalization. The study points

out that tax capitalization may not have been observed for three

reasons. Investors may have been anticipating less discriminatory

changes in the final legislation. In addition the fact that most

non-residents are minimally affected by proposed Canadian tax changes,

coupled with a high degree of non-resident ownership in the oil and

gas industry would reduce the amount of income tax capitalization

in oil and gas stock prices. Furthermore, investors may have been

anticipating the major oil and gas companies through their market

power to maintain the rate of return on oil and gas stocks by shifting

the tax increases either forward to consumers or backward to the

factors of production. Such expectations would not coincide with

expected decreases in the return based on historical data in the

study and accordingly tax capitalization would not be observed.

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CHAPTER I

INTRODUCTION

The neoclassical theory of valuation of the firm suggests that the objective of a firm is to maximize its value. The value of a firm is measured in terms of the market price of its common stock. Investors determine the value of a share of common stock on the basis of future income it will provide. This income takes the form of future dividends per share plus the difference between the buying price and the selling price at the end of a given period of time.

The federal government presently taxes the form of the income from a common stock in different ways. The dividend is included in income and taxed at the investor's marginal tax rate while the dividend tax credit can reduce his tax payable by 20 per cent of the dividend received from a taxable Canadian corporation. Furthermore, if the dividend is received from a Canadian resource company he may have the amount of the taxable dividend reduced by a shareholder depletion allowance of up to 20 per cent of the dividend. On the other hand, the capital gain or loss on the disposal of common stock is not included in the definition of income and is therefore not subject to tax.

The government White Paper, Proposals For Tax Reform, released to the public on November 7, 1969 proposes certain changes

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with respect to the tax treatment of the income from stocks.
Stocks of widely-held companies and closely-held companies are
distinguished in the White Paper but the stocks of the widely-held
company are the primary concern of this study. Widely-held stocks
are those which were listed on recognized Canadian exchanges on
November 7, 1969 or subsequently become so registered. For these
stocks, capital gains which were formerly tax-exempt are to be taxed
at one-half the taxpayer's marginal tax rate with offsetting proposals
of deductibility of one-half the capital losses and gross up and
credit on dividends. The gross up and credit proposal is to replace
the existing dividend tax credit provision but it will be available
only if the company has paid tax, as the scheme is designed to
reduce the effects of double taxation of company income. Furthermore,
for stockholders of resource companies the shareholder depletion
allowance is to be abolished. Thus, the stockholders of companies
which pay little in the way of corporation income tax and who are
losing the shareholder depletion allowance will be more adversely
affected by the proposals than the stockholders of companies which
pay greater amounts of tax and who do not have any shareholder
depletion allowance to lose. Now, let us consider the effects of
these changes.

To best explain the probable result of the proposals,
assume a situation in which stocks are the only available form of
investment. Furthermore, assume that the companies do not have
taxable earnings and that capital gains are greater than capital
losses. Now, the imposition of the proposed capital gains tax with

the offsetting gross up and credit provision would have the same effect on all income from all stocks in that after-tax income would, in general, be reduced. Since there are no other investments for the investor to turn to, his rate of return must be reduced and the market rate of return, which is the same thing, must also be reduced. Accordingly, since there are no alternative investments to which funds can be shifted, stock prices would remain unchanged as a result of the tax. This would also be the expected result if there was a competitor, providing the competitor was small in terms of the overall market. This is due to the fact that only a portion of the money invested in stocks could be shifted to the competitor before the rate of return on the competitor was equivalent to the rate on the stocks because the competitor forms only a small portion of the total market. The phenomenon whereby the imposition of a tax results in constant stock prices and a lowering of the market rate of return is known as tax diffusion. Tax diffusion would be the expected theoretical result if all companies affected did not have taxable earnings and if stocks were the only investments available. On the other hand, all companies are not receiving the same tax treatment from the White Paper. Furthermore, stocks are not the only investments competing for the investors' dollars. Therefore, tax diffusion would not appear to be the expected result.

Now, let us assume a similar situation but with stocks having a relatively small proportion of the total market competing for the investors' dollars with the proposed tax falling only on the stocks. Since stockholders are expected to be rational they

would move to the investment which provides the greatest income, which in this case would be away from stocks because the income from stocks is reduced by the tax relative to other investments. The result of such a move would be to reduce the value of the stock until it once again yielded a rate of return similar to other invest- ments. The market rate would not be lowered appreciably because the owners of stocks are not in this example a sufficient proportion of the total market to cause such a decrease. The phenomenon whereby the imposition of a tax on an asset or the income from the asset results in a decrease in the value of the asset is known as tax capitalization. Because the White Paper discrimates against resource companies and because resource companies are relatively small in the total market for investors' funds the expected result is tax capitalization. Oil and gas companies being resource companies, the oil and gas stocks listed on the Toronto Stock Exchange would appear to provide a unique opportunity to test the theory of tax capitalization. To test for empirical evidence of tax capitalization the following model is set up.

V = capitalized value of a stock (existing legislation)

V_t = capitalized value of a stock (White Paper)

D = dividends provided by a stock in year j

C = capital gain or loss provided by a stock in year j

Y = shareholder depletion allowance (existing legislation)

X = dividend tax credit (existing legislation)

Z = gross up (White Paper)

R = shareholders' marginal tax rate

i = opportunity rate of return on the next best alternative investment

$\triangle V$ = expected change in the value of a stock

$$\triangle V = V - V_t \;\; = \; \sum_{j=1}^{n} \frac{(D_j - YD_j)\,(R-X) \;\; - \;\; [R\,(D_j + Z + .5C_j) + Z]}{(1 + i)^j}$$

If tax capitalization occurs, one would expect that a larger increase in the tax burden would result in a larger decrease in the value of the stock, ceteris paribus. It will be noted in the model that no account has been taken of the change in tax treatment at the corporation level. The reason for this is that the effect, at the corporate level, is expected to be minimal. The detailed discussion of the basis of this assumption is presented in Cahpter III.

The model is employed in Chapter IV to provide estimates of the expected change in value due to tax capitalization. These estimates are then compared to the actual changes in value over the period November 7, 1969 to December 31, 1969. Tax capitalization was not evidenced in the sample in the test period, hence, a discussion is provided of the reasons for this conclusion.

It is intended that the development of the tax capitalization and the empirical use of the model give an insight into the theory of tax capitalization with respect to the value of common stocks. The study is based on a representative sample of oil and gas stocks and even though tax capitalization was not found the model may be used in testing other resource stocks.

CHAPTER II

THE TAX TREATMENT OF THE RETURN FROM COMMON STOCK

Generally an investor in equity stocks realizes a return in two ways: dividends and/or capital gains (losses). Existing tax legislation treats each in a different way and the White Paper proposes changes from the present treatment. The proposed changes do not treat the return from shares of all companies in the same manner. Because of the discriminatory treatment of the return from resource companies by the proposed changes, it is expected that tax capitalization will occur in the stock prices of selected oil and gas stocks. To analyse this it is necessary first of all, to outline the present tax treatment of the return from a stock as well as the changes proposed by the White Paper. The differences in treatment are discussed along with other legislation or proposals which affect the return from stocks, pointing out some of the possible effects of the proposals on stock prices while the detailed discussion of probable effects remains for the following chapter.

Existing Legislation

Historically, capital gains (losses) have been those increases (decreases) in wealth from the holding of an asset which are not defined as income for tax purposes. Whether or not an item is income or capital is

a matter for some concern because, under existing legislation, if a
transaction is treated as capital it is not taxable whereas if it
is considered income, it is taxable. Many tests are employed in deter-
mining whether a transaction is capital or income but the all encom-
passing question generally considered is whether or not the transaction
was ". . . an adventure or concern in the nature of a trade".[1] If
the answer is that it was not, the transaction is normally classified
as one of a capital nature and not subject to tax. Customarily, the
gain (loss) on the purchase and sale of equity stocks has been
considered a capital transaction and therefore not subject to tax.
On the other hand, cash dividends have been included in the definition
of income [2] and therefore were taxable. Stock dividends are speci-
fically excluded from the definition of dividends[3] and therefore from
income and are accordingly non-taxable. Double taxation of corporate
income may occur if a corporation is unable to shift the burden of
its corporate tax payments either forward to the consumers of its
products or backward to the factors of production which it employs.
Double taxation exists in the sense that the corporation pays tax on
its income and the stockholder then pays tax on the amount distributed
to him (from the after-tax corporate income) by way of cash dividends.
To offset the burden of double taxation, the dividend tax credit was
instituted.[4] Under this provision the taxpayer receives a credit
against his tax payable of 20 per cent providing the dividend was
received from a taxable Canadian corporation.[5] However, even though
the purpose of the credit was to offset tax paid by the corporation,
there is no requirement that the corporation ever pay tax.

In addition to the dividend tax credit the stockholders
of certain dividend paying resource companies are entitled to a
depletion allowance[6] on the dividend. The amount of the allowance
is expressed as a per cent of the dividend. However, it is different
from the dividend tax credit in that it is deducted from the dividend
in the calculation of taxable income while the dividend tax credit
is deducted from tax payable. The actual percentage allowed depends
on the proportion which 'mineral profits' constitute of the total
profits of the corporation paying the dividend. Where the 'mineral
profits' in the previous year were: (1) not less than 25 per cent nor
greater than 50 per cent, the rate of shareholder depletion allowance
for the present year is 10 per cent; (2) not less that 50 per cent nor
greater than 75 per cent, the rate for the present year is 15 per cent;
and (3) not less than 75 per cent, the rate for the present year is 20
per cent.[7] The term 'mineral profits' includes profits from oil and
gas wells.

Legislation which has a bearing on the amount of cash a
resource company has available to pay dividends is operator depletion.
The legislation provides that operators of mineral resources, and
this includes oil and gas wells, are entitled to reduce their taxable
incomes by claiming depletion allowances,[8] as specified in the regu-
lations. Normally, this amounts to a deduction of 33 1/3 per cent
of net profits after deduction of eligible expenses[9] which generally
consist of exploration and development expenses.[10] Originally these
allowances were designed to recognize that the size of ore body or
pool of oil was diminishing and part of the return was a return of
capital. Presently, most of the expenses involved in exploring

for and developing mineral resources are deductible and they are no

longer needed for accurate measurement of income. They are now more

or less designed as an incentive to promote exploration and development.[11]

Another item which could have a bearing on the return to

the stockholder is the level of the corporate income tax. Corporations

presently pay a federal tax rate of 21 per cent on the first $35,000

of income and 50 per cent thereafter.[12] Ten per cent of the total tax

is abated to the provinces but in some cases the provinces have levied

a rate greater than 10 per cent. This has increased the effective

corporate tax rate in Alberta in 1969 to 21.5 per cent on the first

$35,000 and 50.5 per cent over $35,000. Ontario and Quebec have 23

per cent and 52 per cent; Newfoundland has 24 per cent and 53 per cent;

Manitoba and Saskatchewan have 22 per cent and 51 per cent; and the

remainder have 21 per cent and 50 per cent respectively.[13]

This completes the discussion of the major existing legislation

bearing on the return from stocks and we now turn to the changes

proposed by the White Paper in this area.

White Paper Proposals

The government proposes various changes from the existing

tax treatment of the return from equity stocks in the government

White Paper, Proposals For Tax Reform. In the first place, a

distinction is drawn between stocks of widely-held companies and

those of closely-held companies. Generally speaking, the stocks of

widely-held companies are those which are listed on a 'prescribed

Canadian stock exchange'[14] on November 7, 1969 or are subsequently
so listed. The companies which do not fit the definition would be
designated closely-held.

The stockholders of the closely-held company would be taxed
as if the total earnings of the corporation were theirs, i.e.
partnership option.[15] On the other hand, if the partnership option
is not chosen, the company will pay tax at the proposed 50 per cent
rate. However, if a distribution is made within two and one-half
years the stockholder would receive credit for the full tax paid
by the company on the profits distributed.[16] The dividend tax
credit would be discontinued. Furthermore, any capital gain made
on the stocks of closely-held companies would be taxed at full
marginal tax rates with a deduction permitted for any loss.[17] Since
this study is primarily concerned with widely-held companies this
discussion of closely-held companies will be sufficient for our
purposes.

The White Paper proposes that capital gains should be
taxed in future. In the case of widely-held companies individual
stockholders will be permitted a deduction of one-half the loss on
the sale of stocks and will be taxed at their marginal tax rate on
one-half the gain.[18] When the proposed system is fully implemented
(after five years) the maximum individual marginal tax rate will
be 51.2 per cent,[19] yielding an effective maximum rate on net capital
gains of 25.6 per cent. In addition to being taxed on realized gains
the stockholder of widely-held stocks will be deemed to realize his
stocks every five years and include one-half the resulting gain or

loss in income at that time.[20] The taxation of realized and unrealized capital gains may bring about heavy taxes in one year due to windfall gains. To alleviate this the White Paper proposes income averaging ". . . but the relief proposed is very minimal".[21]

Changes are also proposed for the taxation of another form of return from stocks, dividends. The present dividend tax credit is to be abolished and replaced by a system of gross up and credit which takes into account the tax paid by the company.[22] The stockholder-taxpayer receives a dividend, to which he adds (or grosses up) 50 per cent of the tax paid by the company on the profits from which the dividend is paid. Tax is then calculated at his marginal rate on this amount and the stockholder then deducts the amount of the gross up from his tax payable and where the gross up is greater than tax payable the stockholder receives a refund of the excess. If there is no taxable income there is no gross up. This proposal applies to stock dividends as well as cash dividends.[23] Furthermore, for the stockholder to receive the gross up the dividend must be paid within two and one-half years.[24]

In addition to the abolition of the dividend tax credit, those taxpayers who received an allowance for shareholder depletion on dividends from companies in the resource industries will lose this benefit.[25] The shareholder depletion allowance is to be abolished completely on the implementation of the proposals. Capitalization of tax may also be reflected in the prices of stocks from changes in the taxation of corporation income.

At this point we turn to a discussion of the proposals which bear on the profitability of the company if it is unable to shift the proposed taxes either forward to its consumers or backward to its factors of production. Initially, all companies will begin to pay income tax of 50 per cent (actually 50 to 53 per cent if the 1969 rates continue). The 21 per cent rate on the first $35,000 is to be removed gradually from companies with income under $105,000 over five years, and removed immediately on implementation of the proposals from companies earning more than $105,000.[26]

Although the White Paper suggests the abolition of the non-operator depletion allowances it proposes that the maximum percentage allowable to operators of resource industries will remain unchanged at 33 1/3 per cent.[27] The amount actually claimed would, however, have to be 'earned', which means that a taxpayer ". . . would run out of depletion allowances unless he continues to explore for and/or develop, Canadian minerals".[28] For example, take a resource company with production profits before eligible expenditures of $6,003. Assume eligible expenditures consisting of exploration and development expenditures to be $3,000, leaving net production profits of $3,003. The maximum depletion allowance which would be permitted under present legislation is 33 1/3 per cent of net production profits ($3,003 x 1/3) or $1,001. However, the maximum permitted under the proposals would be 33 1/3 per cent of eligible expenditures ($3,000 x 1/3) or $1,000. This would leave a taxable income under the proposed system of $2,003 while under the existing system taxable income would be $2,002. The phenomenon of having

the amount of depletion allowance depend on the amount of eligible expenditures is referred to as 'earning depletion'.

This concludes the presentation of the major existing tax legislation and changes proposed by the White Paper which have a bearing on the return from a stock. It was shown that the return from shares of resource companies is being more prejudicially affected than the return from shares of other companies. This is due to the removal of shareholder depletion allowances, the taxing of capital gains, the requirement that the company have taxed earnings to permit gross up as well as the changes in the taxation of corporate income of resource companies. It is expected that a decrease in stock price will result where the return from a stock is being reduced by the changes proposed in the government White Paper. Similarly, it is expected that an increase in stock price will result where the return is being increased by the proposed changes. However, this topic will not be discussed further in this chapter, for the discussion of the possible and probable effect of the changes in tax treatment proposed by the White Paper on stock price forms the subject matter of the following chapter.

REFERENCES

[1]Minister of National Revenue v Taylor (1956) 56 DTC 1131.

[2]Canada, Income Tax Act 1952 RSC c.148 as amended, sec. 6 (1) (a).

[3]Ibid., sec. 139 (1) (k).

[4]Canada, Proposals For Tax Reform (Ottawa, Queen's Printer, 1969), par. 4. 13.

[5]Canada, Income Tax Act, sec. 38

[6]Ibid., sec. 11 (2).

[7]Canada, Statutory Orders and Regulations (Ottawa: Queen's Printer, 1955 Consolidation), p. 1903.

[8]Canada, Income Tax Act, sec. 11 (1) (b).

[9]Canada, Statutory Orders, p. 1900.

[10]Ibid.

[11]Canada, Proposals For Tax Reform, par. 5. 37.

[12]Canada, Income Tax Act, sec. 39.

[13]Canada Income Tax Guide (Ottawa: Commerce Clearing House, 1969), par. 4075.

[14]Canada, Proposals For Tax Reform, par. 4. 43.

[15]Ibid., par. 4. 21.

[16]Ibid., par. 4. 24.

[17]Ibid., par. 4. 33.

[18]Ibid., par. 3. 33.

[19]Ibid., Table 2, p. 25.

[20]Ibid., par. 3. 33.

[21]I.H. Asper, The Benson Iceberg (Toronto: Clarke, Irwin & Company Limited, 1970), p. 72. (For examples of averaging see: Proposals, p. 34).

[22]Canada, _Proposals For Tax Reform_, par. 4. 37.

[23]_Ibid._

[24]_Ibid._

[25]_Ibid._, par. 5. 44.

[26]_Ibid._, par. 4. 30.

[27]_Ibid._, par. 5. 40.

[28]_Ibid._, par. 5. 41.   ('Minerals' includes oil and gas.)

CHAPTER III

DEVELOPMENT OF THE TAX CAPITALIZATION MODEL

Theoretical Tax Capitalization

In the previous chapter we have seen that the White Paper
proposals will result in a decrease in the return from oil and gas
stocks. In this chapter we shall consider a theoretical argument
which would lead us to expect a decrease in the price of these
stocks as a result of the differential tax burden placed upon them.
Both tax diffusion and tax capitalization are evaluated but tax
capitalization appears the more probable result. The tax changes
outlined in the previous chapter are examined to determine whether
they satisfy the necessary requirements for tax capitalization to occur.
This leads to the development of a model designed to test empirically for
evidence of tax capitalization in stock price. The model considers
the proposed changes at the stockholder level only. The latter
part of this chapter discusses the reasons for excluding from
consideration tax changes at the corporate level.

The phenomenon, generally referred to as tax capitalization,
is the process by which a decrease or increase in taxes on an asset
or the income from the asset leads to a change in the value of the
asset. If tax capitalization occurs, the value of the asset will
decrease as taxes increase, ceteris paribus. Similarly, a decrease
in taxes will lead to an increase in the value of the asset. As

16.

Smith has observed:

> If stock does not yield a return competitive
> with that available from alternative invest-
> ments, taking account of differential risks and the
> existing degree of non-fluidity of investment
> funds, it will not be purchased. Or, rather,
> actively traded stocks will continue to be
> brought and sold, but only at prices which
> give competitive returns . . . [1]

Let us now examine some hypothetical examples of tax capitalization.

Assume there are only stocks and bonds competing for the individual's capital and let each have a value of $100, equal risk and a return of $5 per instrument. Let a tax of 20 per cent be imposed on the return from the stock in the hands of the individual. The return from the stock then becomes $4, while the return from the bond remains $5. Let us suppose then, that the market discount rate or the rate on the next best investment (which is the bond in this example) is 5 per cent. We now turn to consider the effect on price where the item taxed composes varying proportions of the market.

As was mentioned previously, bonds and stocks form the total market competing for the capital of the individual. If the stock proportion is small relative to the total market it is expected that investors would move to the investment where they could earn 5 per cent rather than 4 per cent, bringing about a reduction in share prices until the return on a stock is again equal to that on a bond. Since the formula for the discounting of the tax increase, which is expected to remain constant over time, is the change in tax divided by the discount rate, the expected

change in stock price is ($1 ÷ .05) $20. The imposition of the
tax should therefore bring about a fall in the price of the stock
to $80 where it will again give a return of $4 and a rate of return
of 5 per cent. In this example the tax has been fully capitalized.

On the other hand, suppose the stock sector to be very
large in proportion to the total market. In such a situation it
would be virtually impossible for stockholders to shift their funds
to bonds as there would not be sufficient bonds. The most probable
result of the tax on stocks is a decrease in the market discount
rate to approximately four per cent on the bonds, because as stock-
holders move to bonds the price of bonds is bid up and the
return on the bond is reduced. Tax diffusion is the name normally
attributed to the situation where rates of return in general are
reduced and there is little change in the price of assets in the
taxed sector.

Probably the best way of considering the phenomena of
capitalization and diffusion is to consider a large pond connected
to a small pond.[2] In the case of tax capitalization the small pond
would be the stocks which are taxed. The removal of water (tax)
affects the large pond very little, i.e. the interest rate decreases
very little. However, if the taxed stocks are the large pond, the
removal of the water (tax) lowers the level of both ponds sub-
stantially, i.e. the interest rate is lowered appreciably. It can
be seen then that one requirement of tax capitalization is that the
tax must be imposed on a relatively small segment of the total
market.

Normally the theory of tax capitalization is applied to land but under certain circumstances Beuhler[3] states it can be applied to securities. The circumstances to which he refers are: (1) an income yielding object or something which is capable of having value, (2) relatively long life, (3) some inequality in tax treatment, and (4) a degree of certainty in the amount of tax.

The reasoning behind the tax being applied to the income or value of something which is capable of having value is founded on the premise that there must be some value in which the tax can be reflected. If the item was not capable of having value even though it was taxed, tax capitalization could not be measured.

The item which is being analysed for tax capitalization must also have a relatively long life and have a relatively inelastic supply. If it had a relatively short life, the item could disappear immediately on the imposition of the tax. Furthermore, the supply must be relatively inelastic, otherwise, supply could be increased or decreased at will with no real impact being observed from the tax.

The change in the burden of taxation must be discriminatory. Suppose a market competing for the investors' capital which is entirely composed of common stocks and prior to the imposition of a tax on the total return from the stocks assume the market to be in equilibrium. Since by assumption there is no higher return available, the market will remain in equilibrium at a lower price with the imposition of the tax. Therefore, the rate of return in the marketplace will decrease. However, if the tax is discriminatory, the rational investor moves

his funds to the investment where he can earn the higher rate of return and the tax on the instrument which has been discriminated against will be capitalized.

There must also be a degree of certainity in the amount of tax. This is required so the investor can measure the amount of his altered tax burden.

Let us consider whether the necessary conditions for tax capitalization have been met in the case of the proposed changed involving stocks of natural resource companies. To begin with stocks provide an income in the form of dividends and capital gains (losses) and the value of such income is reflected in the quoted prices of the stocks in the case of widely-held companies. Thus the first circumstance, value, is satisfied. The stocks of a widely-held company also have a relatively long life and a relatively inelastic supply since stocks in such companies cannot be created or wiped out without a period of time passing. This satisfies the second circumstance. Now we need a discriminatory tax, oil and gas companies have been selected for this study because of the discriminatory tax treatment accorded them in the White Paper. As evidence of discrimination Mr. Benson observed with regard to the gross up and credit scheme which is to offset the capital gains tax that "Corporations in the resource industries, public utilities and other capital intensive industries will be adversely affected by this change."[4] The removal of the shareholder depletion allowance from the stocks of dividend paying oil and gas companies will also adversely affect the income to

stockholders in this industry. In addition to being discrimated
against in tax vis-a-vis the stocks of other companies, the oil and
gas stocks must compete with other investments such as bonds and
mortgages for the investor's dollar. Therefore the third circum-
stance, inequality of tax treatment, would appear to be satisfied.
The fourth circumstance, a degree of certainty in the amount of tax,
is also satisfied by the White Paper as the amount of the tax change
can be computed from it.

The Tax Capitalization Model

Now, for an increase in the tax burden on stocks the value
of the stocks should be reduced, _ceteris paribus_ and similarly for
a decrease in the tax burden the value of the stock should be
increased. The following model illustrates the manner in which
capitalization of income taxes affects stock values.

V = capitalized value of a stock (existing legislation)

V_t = capitalized value of a stock (White Paper)

D_j = dividends provided by a stock in year j

C_j = capital gain or loss provided by a stock in year j (equals the price in year j minus the price in j-1)

Y = shareholder depletion allowance (existing legislation)

X = dividend tax credit (existing legislation)

Z = gross up (White Paper)

R = stockholders' marginal rate of taxation

i = opportunity rate of return on the next best alternative investment

(a) $$V = \frac{D_1 - [(D_1-YD_1)\ (R-X)] + C_1}{1 + i} + \frac{D_2 - [(D_2-YD_2)\ (R-X)] + C_2}{(1 + i)^2} + \ldots$$

$$+ \frac{D_n - [(D_n-YD_n)\ (R-X)] + C_n}{(1 + i)^n} = \sum_{j=1}^{n} \frac{D_j - [(D_j-YD_j)\ (R-X)] + C_j}{(1 + i)^j}$$

(b) $\quad V_t = \dfrac{D_1 - R(D_1+Z) + Z + C_1 - R(.5C_1)}{1 + i} + \dfrac{D_2 - R(D_2+Z) + Z + C_2 - R(.5C_2)}{(1 + i)^2} + \ldots\ldots\ldots$

$\quad + \dfrac{D_n - R(D_n+Z) + Z + C_n - R(.5C_n)}{(1 + i)^n} = \displaystyle\sum_{j=1}^{n} \dfrac{D_j - R(D_j+Z) + Z + C_j - R(.5C_j)}{(1 + i)^j}$

(c) $\triangle V = V - V_t = \dfrac{\displaystyle\sum_{j=1}^{n} \dfrac{D_j - (D_j - YD_j)(R-X) + C_j}{} - \displaystyle\sum_{j=1}^{n} \dfrac{D_j - R(D_j+Z) + Z + C_j - R(.5C_j)}{}}{\displaystyle\sum_{j=1}^{n}(1+i)^j}$

$\quad = \displaystyle\sum_{j=1}^{n} \dfrac{(D_j - YD_j)(R-X) \; - \; [R(D_j+Z+.5C_j)+Z]}{(1 + i)^j} = \displaystyle\sum_{j=1}^{n} \dfrac{\triangle T}{(1+i)^j}$

V represents the value of the stock under the present tax treatment

and V_t represents the value of the stock under the proposed tax

treatment. Therefore, $\triangle V$ is the capitalized value of the expected

change in the tax ($\triangle T$) on the return from the stock. The capitalized

value of the change in future income taxes will equal each year's

change in tax divided by the discount factor $(1 + i)^j$, assuming that

the unexpected tax change may vary from year to year. However, if

a constant tax change is expected to occur in each future year the

capitalized value of the tax is the annual change in tax divided

by the discount factor, i: $\quad \triangle V = \dfrac{\triangle T}{i}$

As was shown in Chapter II, the White Paper proposes changes

in the tax treatment of the corporate income of oil and gas companies.

Consideration of the changes however, was excluded in the development

of the capitalization model. The following discussion outlines

the reasons for their exclusion.

Capitalization Of The Corporate Income Tax

The corporate income tax is the tax which the company pays on its income. As was pointed out in Chapter II the tax rate on corporate income is approximately 21 per cent on the first $35,000 of income and approximately 50 per cent thereafter. However, in the case of oil and gas companies the amount of taxable production profits (i.e. profits after deduction of exploration and development expenses) is reduced by the operator depletion allowance, which is equal to one-third of taxable production profits. For example, where an oil and gas company had taxable production profits of $90 it would pay tax on only $60. There is no requirement that the company carry on any exploration or development to obtain the allowance in contrast to the White Paper proposals.

Upon enactment of the White Paper provisions it would be necessary for oil and gas companies to 'earn' the depletion allowance on all properties acquired after November 7, 1969, (White Paper Day). To 'earn' depletion means a company would receive one dollar of depletion allowance on taxable production profits for every three dollars spent on exploration and development. After 1975 it would be necessary to 'earn' the depletion allowance on all properties no matter when they were acquired. These provisions could be expected to lower after-tax earnings of oil and gas companies which do not spend 150 per cent of net production profits on exploration and development.[5] Accordingly, if the after-tax earnings of the company are reduced the additional tax could be capitalized and reflected in the value of its stock.

On the other hand, there are reasons to believe the effect of the proposed corporate income tax changes on the prices of oil and gas stocks will be minimal. First, the operator depletion proposal does not require that depletion be earned on property held on White Paper Day until five years after enactment of legislation. Second, the depletion available on these presently-held properties can be carried forward indefinitely.[6] Therefore these proposals push the full effect of the depletion proposal at least five years into the future. Accordingly, the effect of these future tax changes on present stock prices is reduced in comparison to those changes which have their full effect in the present. The second reason for expecting the effect of corporate income tax changes on stock price to be minimal is the evidence of the shifting of corporate income tax changes, a discussion of which follows.

There appear to be two distinct schools of thought concerning the shiftibility of the corporate income tax. The traditional school contends that the corporation income tax cannot be shifted backward to the factors of supply which the company employs or forward to the consumers of its products on the ground that the firm is already maximizing profits. Being in equilibrium prior to the tax, the tax must be borne by the stockholders as an increase in the price of the product would decrease the amount purchased and a decrease in the amount produced would not be using plant at its maximum efficiency. Therefore, the short run effect of the tax is expected to reduce capital formation in the long run which does shift the tax in the long run.

The other school, which I shall name the modern school, was brought into formal existence with an empirical study by Krzyzaniak and Musgrave.[7] Their study applied time series data to fit a function in which the rate of return is the dependent variable and tax factors are among the predetermined variables. The regression coefficients of the variables were derived and then employed to estimate the difference between the observed rate of return and that which would have prevailed without the tax. The results were that even at 99 per cent confidence limits an interval from 102 to 166 per cent was obtained[8] which sustains the hypothesis of at least 100 per cent shifting in the short run. Therefore the modern school disagrees with the traditional school regarding shifting in the short run. However, the modern school agrees with the traditional school on the question of long run shifting. The modern school would say that since the tax is shifted in the short run it is shifted in the long run, but for a different reason. Their reasoning is that given greater than 100 per cent shifting in the short run the depressing effects on the rate of return would be recouped almost immediately and therefore there would be no long run depressing effects on capital formation.

Two proponents[9] of the traditional approach have criticized the Krzyzaniak-Musgrave study primarily on the ground that the tax effects could not be completely isolated from other factors in the economy which may have brought about the same result. It is interesting to note that Slitor[10] in attempting to discredit the Krzyzaniak-Musgrave results while using their model arrives at a

value of just less than 100 per cent shifting. As well, Levesque[11]
in a Canadian study criticizes the Krzyzaniak-Musgrave study on
essentially the same grounds of inability to separate the tax
effects. He then discounts time series in favour of cross section
regression analysis and comes up with 70 per cent shifting in the
short run.[12] Furthermore, he observes that

> while the inability to isolate the tax effects from
> the influences of changes in public expenditures
> highly correlated with the tax rate changes may cause
> the shifting indicators to overstate the true degree
> of shifting, a result in excess of 100 per cent is
> not necessarily wrong.[13]

Accordingly this study accepts the conclusion of the modern school that
the corporate income tax is shifted in the short run.

The other proposal in this area of company income tax which
may have a bearing on the profitability of the company is the removal
of the 21 per cent tax rate on the first $35,000 of income. However,
the effect of this is also expected to be minimal. First, there
is evidence that it will be shifted, as shown previously. Second,
the maximum advantage to be gained from present legislation over the
proposed is $10,150 and this is spread over many shares. Third, for
companies with earnings uncer $105,000 the rate advantage will be
removed over a five year period from implementation of legislation.[14]

In summary minimal effect is expected on present stock
prices from capitalization of the proposed corporate tax changes for
three reasons. First, the depletion changes do not become fully
effective until at least five years in the future. Second, there is
a minimal effect from the removal of the 21 per cent rate. Third, there
is evidence to suggest that corporate income tax changes are fully

shifted. For all these reasons this study has neglected tax changes
at the corporate level in testing for evidence of tax capitalization in
stock prices. Accordingly the model developed in this chapter is
employed in the following chapter to empirically test for evidence
of tax capitalization in the prices of selected oil and gas stocks.

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[3] A.G. Beuhler, "The Capitalization Of Taxes" National Tax Journal III (December, 1950), p. 284.

[4] E.J. Benson, "Taxation Of Corporations And Their Shareholders" (unpublished speech, Canada, Department of Finance, Ottawa, May 21, 1970), p. 11.

[5] Senate of Canada, Proceedings of the Standing Senate Committee on Banking, Trade and Commerce, No. 14 (Second Session - Twenty-eighth Parliament, April 8, 1970), Appendix A, p. 69.

[6] Canada, Proposals For Tax Reform, par. 5. 42.

[7] Marian Krzyzaniak and Richard A. Musgrave, The Effects Of The Corporation Income Tax - An Empirical Study (Baltimore: The John Hopkins Press, 1963).

[8] Ibid., p. 46.

[9] Richard Goode and Richard E. Slitor, Effects Of Corporation Income Tax, Marian Krzyzaniak, ed., (Detroit: Wayne State University Press, 1966).

[10] Ibid., Table 21, p. 159.

[11] R.J. Levesque, Studies Of The Royal Commission On Taxation, XVII (Ottawa: Queen's Printer, 1967).

[12] Ibid., p. 167.

[13] Ibid., p. 39.

[14] Canada, Proposals For Tax Reform, par. 4. 30.

CHAPTER IV

EMPIRICAL TESTING OF THE TAX CAPITALIZATION MODEL

In general this chapter discusses the testing for empirical evidence of tax capitalization in the stock prices of various oil and gas stocks. The model developed in the preceeding chapter is employed

$$\triangle V = \sum_{j=1}^{n} \frac{(D_j - YD_j)(R-X) - [R(D_j+Z+.5C_j) + Z]}{(1+i)^j}$$

The chapter is divided in three parts. The first discusses the selection of the sample and the derivation of values which are needed in the model. It can be seen from the model that values are needed for D_j (dividends), Z (gross up), C_j (capital gain or loss), Y (shareholder depletion allowance), R (shareholders' marginal tax rate), X (dividend tax credit), and i (rate of return on the next best alternative investment). The second part discusses the actual estimating of the expected changes in the value of an oil and gas stock due to the differential taxation proposed by the White Paper. The third portion compares the expected changes to the changes which actually occurred and discusses the statistical tests performed on the results. In addition a number of possible reasons why tax capitalization was not observed in the prices of the sample stocks are considered.

Selection Of The Sample And Derivation Of Terms

There are twenty-nine oil and gas stocks in the sample had these are listed in Table 4-1. Regression equations are employed in the prediction of future earnings, dividends and stock prices. The reliability of this procedure is increased by increased data. Initially 81 stocks listed on the Toronto Stock Exchange on November 7, 1969 were considered for the sample. The selection of the final number of 29 was based on the availability of sufficient data on prices, earnings and dividends. Data was available for 11 years* on the 29 stocks in the sample from the Financial Post Survey Of Oils. Accordingly price, earnings and dividend information was collected for the stocks in the sample for 11 years, 1958 through 1968. This data was adjusted to reflect that an investor held $100 at the average high-low of 1958. For example if the yearly high price of a stock in 1958 was $15 and the yearly low price in 1958 was $5 the average yearly high-low price of 1958 would be $10. Since an investor is assumed to hold $100 of the stock, he would hold 10 shares of this particular stock. Furthermore, assume pre-tax earnings per share of $2.50, after-tax earnings per share of $2.00 and dividends per share of $1.50. Accordingly pre-tax earnings, after tax earnings and dividends on his holding of $100 would be $25, $20 and $15, respectively. The specific uses of the data will become evident in the following discussion of the terms used in the capitalization model.

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*A decrease in the number of years to seven would only have increased the sample size to 36.

TABLE 4-1

STOCKS IN THE STUDY

Asamera Oil Corporation Limited

Banff Oil Ltd.

Canadian Homestead Oils Limited

Canadian Tricentrol Oils Ltd.

Central-Del Rio Oils Ltd.

Charter Oil Company Limited

Consolidated East Crest Oil Company Limited

Consolidated West Petroleum Limited

Dome Petroleum Limited

Great Plains Development Company of Canada Ltd.

Gulf Oil Canada Limited

Home Oil Company Limited

Hudson's Bay Oil and Gas Company Limited

Husky Oil Ltd.

Imperial Oil Limited

Midcon Oil & Gas Limited

Mill City Petroleums Ltd.

National Petroleum Corp. Ltd.

New Continental Oil Co. of Canada Limited

Okalta Oils, Limited

Pacific Petroleums Ltd.

Petrofina Canada Ltd.

The Petrol Oil & Gas Company Limited

Scurry-Rainbow Oil Limited

Spooner Mines & Oils Limited

Supertest Petroleum Corporation, Limited

Texaco Canada Limited

Triad Oil Co. Ltd.

Western Decalta Petroleum Limited

Future dividends per $100 invested at the average high-low

stock price of 1958 are used in the prediction of future stock prices.

In addition to this, future dividend payout is required as a separate

term (D_j), in the capitalization model. A regression equation was

employed in the prediction procedure and this required the selection

of an independent variable. Dividend payout was found fairly consistent

over time and therefore time (T) was selected as the independent

variable. The method of ordinary least squares was employed to provide

estimates of the coefficients in the regression

(a) $D = b + b_1 T$.

It can be seen that a linear regression equation is employed with

dividends (D), being regressed on time (T), to provide estimates of

b and b_1. These values as well as the standard errors* are found in

Table 4-2 for each company which paid dividends. In the table the

standard error of b_1 is found in brackets directly beneath b_1 while

the standard error of estimate for the equation is presented in a

separate column. Once the values of b and b_1 were obtained, years

subsequent to 1968 were substituted for T in (a) to provide predictions

of future dividends per $100 invested at the average high-low stock

price of 1958.

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*When a regression equation is employed to estimate values of a dependent
 variable the normal assumption is made that there is a relationship
 between the dependent variable and the independent variable. However
 differences do occur between the estimated values of the dependent
 variable and the actual values of the dependent variable. These
 differences are due to variations in the dependent variable which were
 unrelated to changes in the particular independent variables used in the
 analysis. The normal measure in determining the significance of these
 deviations of actual from estimated values is the standard error of
 estimate and the larger the standard error of estimate the poorer the
 realiability of estimates from the regression equation.

TABLE 4-2

REGRESSION COEFFICIENTS AND STANDARD ERRORS OF EQUATIONS (a), (b) AND (d) EMPLOYED IN THE PREDICTION OF DIVIDEND PAYOUT (D_j), AFTER-TAX EARNINGS (E) AND YEARLY AVERAGE HIGH-LOW STOCK PRICE (P), RESPECTIVELY.

Stock	After-Tax Earnings			Dividends			Stock Price			
	a	a_1	S.E. of Estimate	b	b_1	S.E. of Estimate	c	c_1	c_2	S.E. of Estimate
1. Central-Del Rio	-.83	.81 (.09)	.90	-.28	.32 (.03)	.35	55.64	53.61 (34.35)	-4.40 (13.65)	40.25
2. Husky	-6.98	1.48 (.06)	.65	-.83	.23 (.06)	.66	70.15	-.16 (2.21)	40.99 (11.04)	23.44
3. Dome	-5.76	2.75 (.23)	2.36				20.33	17.75 (2.75)		81.41
4. Imperial	3.34	.36 (.01)	.14	2.33	.24 (.02)	.19	11.11	22.35 (21.28)	-5.05 (30.77)	13.38
5. Scurry-Rainbow	1.47	.33 (.06)	.65				19.41	33.19 (17.88)		71.24
6. Hudson's Bay	-.75	.67 (.04)	.44	-.34	.29 (.03)	.28	51.82	52.22 (11.96)	-86.36 (27.42)	20.34
7. Consolidated East Crest	18.77	-3.64 (1.01)	10.55				172.28	8.54 (.73)		36.08
8. Home	-2.92	1.20 (.36)	3.81	.84	.18 (.03)	.33	-11.90	-3.32 (1.79)	63.89 (14.20)	19.01
9. Petrofina	.19	.78 (.08)	.84	-.54 (-.12)	.54 (.12)	1.24	82.36	1.30 (2.42)	.48 (3.04)	12.65
10. Texaco	3.54	.48 (.09)	1.00	2.40	.08 (.02)	.23	-56.51	.20 (6.95)	55.86 (39.09)	10.75

TABLE 4-2 (continued)

Stock	After-Tax Earnings			Dividends			Stock Price			
	a	a_1	S.E. of Estimate	b	b_1	S.E. of Estimate	c	c_1	c_2	S.E. of Estimate
11. Banff	-4.58	1.43 (.68)	7.16				216.89	13.05 (11.03)		288.77
12. Western Decalta	-4.80	1.18 (.20)	2.12				108.88	10.52 (3.99)		55.48
13. Supertest	6.69	.61 (.19)	1.94	3.27	-.04 (.02)	.24	21.44	9.91 (2.06)	-2.54 (21.05)	17.59
14. Canadian Homestead	-10.74	1.65 (.22)	2.30				130.25	13.88 (5.34)		99.42
15. Mill City	-3.71	3.17 (2.43)	25.48				195.41	5.43 (3.30)		274.72
16. Gulf	2.76	.24 (.02)	.26	2.45	.03 (.01)	.07	-124.96	-10.97 (4.93)	99.08 (37.44)	8.63
17. Great Plains	.83	.48 (.14)	1.46	-.81	.29 (.05)	.49	46.50	13.81 (5.73)	-19.94 (11.36)	15.93
18. National	-.33	-.15 (.09)	.96				113.4	-8.05 (11.56)		37.57
19. Canadian Tricentrol	-9.29	1.94 (.43)	4.49				41.15	1.35 (3.06)		74.43
20. Charter	-8.94	.176 (.140)	1.47				236.60	9.02 (38.21)		182.23
21. Pacific	-2.78	.55 (.07)	.70	-.35	.09 (.03)	.36	69.84	-5.15 (2.54)	44.66 (10.88)	11.73

TABLE 4-2 (continued)

Stock	After-Tax Earnings			Dividends			Stock Price			
	a	a_1	S.E. of Estimate	b	b_1	S.E. of Estimate	c	c_1	c_2	S.E. of Estimate
22. Asamera	-.01	.10 (.30)	3.12				134.42	35.00 (23.94)		227.19
23. Midcon	.65	-.05 (.17)	1.79				62.21	-5.01 (4.07)		22.02
24. New Continental	-3.59	1.18 (.71)	7.40				161.12	1.06 (7.66)		194.86
25. Okalta	-21.59	2.68 (.44)	4.58				15.73	-2.52 (.49)		15.36
26. Spooner	-.35	.35 (.48)	5.01				351.71	-32.36 (32.36)		500.51
27. Petrol	-1.93	.66 (.14)	1.47				101.08	-6.95 (4.20)		34.27
28. Triad	-8.71	1.17 (.10)	1.06				55.39	-3.35 (1.61)		20.51
29 Consolidated West	3.54	-.30 (.22)	2.35				28.36	8.52 (1.68)		12.94

Future after-tax earnings per $100 invested at the average high-low stock price of 1958 are also employed in the prediction of future stock price. As in the case of dividends, after-tax earnings, appeared to be fairly consistent over time. Accordingly, using ordinary least squares, after-tax earnings were regressed on time (T), to provide estimates of the coefficients a and a_1 in the linear regression equation

$$(b) \quad E = a + a_1 \, T.$$

The values obtained for a, a_1 and the standard errors are found in Table 4-2. The standard error of a_1 is found directly beneath a_1 while the standard of estimate for the equation is presented in a separate column. Once the values of a and a_1 were calculated, years subsequent to 1968 were substituted for T in (b) to obtain predictions of future after-tax earnings.

Future pre-tax earnings per $100 invested at the average high-low stock price of 1958 are employed in the prediction of future available gross up (Z). As in the case of dividends and after-tax earnings, pre-tax earnings were found fairly consistent over time. Consequently, employing the method of ordinary least squares, pre-tax earnings were regressed on time (T), to provide estimates of the coefficients d and d_1 in the linear regression equation

$$(c) \quad E_1 = d + d_1 \, T.$$

The values of d, d_1 and the standard errors are found in Table 4-3. The standard error of d_1 is found in brackets directly beneath d_1 while the standard error of estimate for the equation is presented in a separate column. It can be seen in the table that equation (c)

TABLE 4-3

REGRESSION COEFFICIENTS AND STANDARD ERRORS OF EQUATION (c)
EMPLOYED IN THE PREDICTION OF PRE-TAX EARNINGS (E_1) FOR
DIVIDEND PAYING COMPANIES WHICH HAD A TAX PAYOUT.

Stock	d	d_1	S.E. of Estimate
Gulf	2.13	.54 (.03)	.35
Imperial	6.09	.42 (.04)	.44
Pacific	-2.81	.56 (.07)	.69
Supertest	15.68	.94 (.37)	3.90
Texaco	6.00	.72 (.28)	2.96

was used for five companies. Other dividend paying companies had after tax earnings equal to pre-tax earnings.

With future pre-tax earnings (E_1) and future after tax earnings (e) estimated a discussion of future available gross up (Z) is relevant since gross up depends on both the amount of dividends paid and on the taxes paid by the oil and gas company. In the calculation of future available gross up two assumptions were made. It was assumed first of all that dividends will only be paid in the future by those oil and gas companies which currently have a dividend payout. Non-dividend paying oil and gas companies could begin to pay dividends, however a lack of historical data on which to base predictions required an assumption that dividends would not be paid by these companies. Secondly it was assumed that taxes paid by the dividends paying oil and gas companies would provide reasonable estimates of future tax payments. Changes are proposed for the taxation of future corporate income of oil and gas companies. As indicated previously these changes are primarily the removal of the 21 per cent rate from the first $35,000 of corporate income (where the maximum additional tax is $10,150), the requirement that oil and gas companies 'earn' depletion. In the case of oil and gas companies earning less than $105,00 the 21 per cent will be removed over five years where time discounting will lessen the impact on present tax payments while oil and gas companies earning more than $105,000 will lose the 21 per cent tax rate on enactment of legislation. However in the latter case where the impact is almost immediate the $10,150 increase in tax is minimal and is spread over many shares. The requirement that oil and gas companies 'earn' depletion may cause

an increase in tax paid by these companies. However, as indicated in Chapter III, the depletion allowance need not be earned on properties held on November 7, 1969 until 1975 and any depletion allowances acquired on these before 1975 can be carried forward indefinitely. Therefore the postponing of the operator depletion proposal should prevent any appreciable increase in taxes at the present time. Consequently historical tax payments have been employed in the prediction of future tax payments. Based on the preceeding discussion, the calculation of future tax payments is $E_1 - E$.

The shareholder is permitted to gross up his dividend by one-half the tax paid by the company to a maximum 50 per cent of the dividend payment ($0.5 \times D$). For example if an oil and gas company paid tax per share of one dollar and paid dividends per share of three dollars the shareholder would be permitted a gross up of fifty cents. On the other hand, if an oil and gas company paid tax of five dollars and paid a dividend of three dollars the shareholder would be permitted a gross up of only one dollar and fifty cents or one-half the dividend payment. Therefore the calculation of gross up is

$$Z = \text{the lesser of } (E_1 - E)/2 \text{ and } 0.5 \times D.$$

Having estimates of future dividend payout, from equation (a), and estimates of future after-tax earnings, from equation (b), we turn to a discussion of the prediction of future average high-low stock price where these estimates will be employed.

In the controversy surrounding stock price prediction there are two distinct schools. One school, led by Miller and Modigliani[1]

contends that dividends are irrelevant whereas the other school, headed

by Gordon[2] contends that dividends are important. Both schools agree

that earnings are relevant. Miller and Modigliani rely on an assumption

of perfect capital markets which includes ". . . no tax differentials

either between distributed and undistributed profits or between divi-

dends and capital gains".[3] On the other hand, a Canadian study observes

that ". . . since the differentials exist, rational investors will

presumably take them into consideration in determining the prices they

are prepared to pay for corporate equities. . ."[4] In fact, Miller

and Modigliani agree that the absence of tax differentials is less

than a perfect assumption.[5] Furthermore, this study involves an analysis

of tax differentials and to exclude them in one part of the study would

appear inconsistent with the overall analysis of tax capitalization.

Accordingly this study employs both after-tax earnings and dividends

(where applicable) in the prediction of future stock prices.

The ordinary least squares method was also used to obtain

estimates of the average yearly high-low prices of each stock from the

eleven years historical data. The independent variables in this cal-

culation were after-tax earnings (E) and dividends (D) per $100

invested at the average yearly high-low stock price of 1958, with the a

average yearly high-low stock price as the dependent variable. Values

for the coefficients c, c_1 and c_2 were then compared in the following

regression equation:

$$\text{(d)} \quad P = c + c_1E + c_2D$$

The values of c, c_1 and c_2 as well as the standard errors are presented

in Table 4-2. The figures in brackets directly beneath the values of c_1 and c_2 are their standard errors while the standard error of estimate for the equation is presented in a separate column. Once these values were obtained the predicted future values of E and D from equations (b) and (a), respectively were substituted in equation (d) to provide estimates of future average high-low stock prices. The values obtained were used to calculate the yearly capital gain or loss (C) for use in the capitalization model. The yearly capital gain or loss is simply the average high-low price in the year minus the average high-low price in the previous year. With estimates provided for C we turn to a consideration of the value to be used for Y, the shareholder depletion allowance.

Under existing legislation shareholder depletion is permitted on the dividends paid by certain companies in the sample (see Table 4-4). Because it affects the after-tax return on these stocks it is necessary to obtain a rate for Y for use in the capitalization model. It is assumed that prior to White Paper Day that investors would expect the rate presently being paid to continue. This rate would be the rate payable in 1969 because shareholder depletion is permitted on the basis of 'mineral profits' earned in 1968. Shareholders would therefore be able to calculate the shareholder depletion rate for 1969 prior to White Paper Day and this is the rate they would be led to anticipate in the future. Furthermore, these rates have fluctuated very little.

We now turn to a discussion of the marginal tax rate (R) employed in the capitalization model. This rate has been assumed

TABLE 4-4

1969 SHAREHOLDER DEPLETION RATES ON DIVIDEND PAYING STOCKS

Stock	Dividends Paid	Shareholder Depletion Allowance
1. Central-Del Rio	X	20%
2. Husky	X	20%
3. Dome		
4. Scurry Rainbow		
5. Hudson's Bay	X	20%
6. Imperial	X	20%
7. Petrofina	X	10%
8. Home	X	0%
9. Consolidated East Crest		
10. Texaco	X	10%
11. Banff		
12. Great Plains	X	20%
13. Western Decalta		
14. Canadian Homestead		
15. Supertest	X	0%
16. Mill City		
17. National		
18. Pacific	X	0%
19. Canadian Tricentrol		
20. Charter		
21. Gulf	X	20%
22. Asamera		
23. Midcon		
24. New Continental		
25. Okalta		
26. Spooner		
27. Petrol		
28. Triad		
29. Consolidated West		

to be 50 per cent. Considerable difficulty was experienced in this
area due to the absence of definitive studies in Canada concerning
the marginal tax rates of individuals. The reason for this absence
is pointed out by Goffman in his study of the burden of taxes on
the Canadian taxpayer:

> . . . the top income class . . . is an
> open-ended one which includes all those with
> incomes over $7,000. This treatment is
> certainly not desireable but unfortunately
> it is unavoidable since the D.B.S. Surveys
> use $7,000 as the cutoff.[6]

Furthermore, statistics are unavailable on the tax rates appli-
cable to capital gains since taxes have not been paid on them
previously. However, in the area of capital gains, we have a pre-
cedent set by the Royal Commission on Taxation in dealing with
stock gains of public companies. The Royal Commission assumed that
capital gains on stocks were equivalent to dividends for each income
class.[7] This study assumes for the purpose of determining the marginal
tax rate on capital gains that the amount of stock gains is equal
to the amount of dividends for each income class and therefore that
the marginal tax rate of investors on dividends is equal to the
marginal tax rate of investors on stock gains.

Due to the absence of any definitive Canadian studies on
marginal tax rates, a number of studies based on United States data
were considered. Holland calculated the average marginal tax rate on
dividends to be 55.16[8] per cent for 1952 while Donaldson, using 1959
data, found the ". . . average range income received per class, is
52% to 63%."[9] The two most recent studies reviewed the individual

tax return statistics for 1962 and predicted the average marginal tax rates on individual dividend income for 1965 to be 36^{10} per cent and 46^{11} per cent. There appears to be a lack of agreement in the studies while the mean is in the vicinity of 50 per cent. It should also be pointed out that companies can be stockholders and the corporate tax rate would approximate 50 per cent. Furthermore, the 50 per cent rate is the most interesting, for it is at this rate, under the White Paper Proposals, that it makes no difference whether a dollar is received as a stock gain or in dividends.[12] For all these reasons the 50 per cent rate was chosen.

The dividend tax credit (X) reduces tax payable of a taxpayer by 20 per cent of the taxable dividend received from a taxable Canadian corporation. However a rebate of the credit is never paid. In the present study since the taxpayer's marginal tax rate is assumed to be 50 per cent it is also assumed that the taxpayer will have tax payable greater than 20 per cent of the taxable dividend. Accordingly, 20 per cent is the rate employed in the tax capitalization model for the dividend tax credit (X).

The last item in this section is the discussion of the selection of i, the rate of return on the next best alternative investment in the capitalization model. A logical choice for the next best alternative to investment in oil and gas stocks would be investment in common stocks in general. Therefore, it has been assumed that the rate of available on the next best alternative invest-ment is the historical rate of return on common stocks that was

available prior to the implementation of the White Paper. What

is this rate? The most comprehensive study in the area has been

done by Fisher and Lorie.[13] In their study they analysed all the

stocks on the New York Stock Exchange during the period 1926 to 1960

and calculated rates of return for various time periods. Since no

Canadian study is as comprehensive and since Canadians do invest

on this exchange the rate of return has been chosen on the basis of

their study. The rate selected in 15[14] per cent. This excludes

taxes paid by the investor and applies to the most recent ten year

period of their study, 1950 to 1960.

This concludes the discussion of the various values of

the terms used in the capitalization model. The stage is now

set for the use of the model and a discussion of the results obtained.

Use Of The Capitalization Model

To begin, the average yearly high-low price per share, earnings

per share, and dividends per share were all brought to the base 100

in 1958, primarily to provide a basis of comparison between and

among the various stocks in the sample. This means the investor

is assumed to have purchased $100 or each stock at the yearly

average high-low price in 1958. For example, the yearly low price

of Dome Petroleum was $7.70 and the yearly high price was $13.625 which

yields an average yearly high-low price for Dome of [($7.70 +

$13.625)/2] $10.66. Dome did not have dividends but after-tax earnings

per share in 1958 were $.04. Then the investor was assumed to hold

$100 of Dome which means he held 9.38 shares at the average high-low

price for 1958 with after-tax earnings in that year of $.38. Thus the

expected change in value reflected the fact that the investor held 9.38

shares of Fome. However, the values in the calculated change in

value column of Table 4-5 reflect the changes in value which would

have been experienced by an investor holding $100 of a stock on

November 7, 1969 (valued at average high-low market prices for that day).

This was done to facilitate comparibility with the actual changes in

value as discussed in the following section of this chapter.

Of the 29 stocks in the sample, 18 did not pay dividends.

For holders of these stocks the shareholder's tax bill under present

legislation would be zero, even if a capital gain occurred. On

the other hand, under the White Paper proposals the stockholder's

tax bill would be the marginal tax rate times one-half the stock

gain. In the case of Dome Petroleum which had an expected capital

gain of $24.40 the expected increase in tax would be (50% of $24.40)

$12.20.

Since a linear regression equation was used to forecast

future stock prices the gain or loss would be constant from year

to year. It follows from the model that the annual increase in tax

would be a constant. The sum of a geometric progression to infinity

where the change is constant is the constant term divided by the

discount factor. In this study, this sum to infinity would be

$\Delta T/i$ (where ΔT is the amount of the change in tax in any year and

i is the rate of return available on the next best investment)

yielding the change in value as a result of the tax change being

capitalized as $\Delta V = \Delta T/i$. For example, Dome had a constant yearly

TABLE 4-5

EXPECTED AND ACTUAL CHANGES IN VALUE OF $100 OF THE STOCK
HELD ON NOVEMBER 7, 1969

Stock	Changes in Value (ΔV)	
	Expected	Actual
	$	$
1. Central-Del Rio	-53.57	2.75
2. Husky	-16.81	-12.27
3. Dome	-11.97	29.66
4. Scurry Rainbow	-10.95	- 8.90
5. Hudson's Bay	-10.85	8.59
6. Imperial	-10.01	6.20
7. Petrofina	- 9.95	- 4.01
8. Home	- 7.89	-18.57
9. Consolidated East Crest	- 7.51	38.60
10. Texaco	- 5.80	- 4.57
11. Banff	- 4.76	-10.59
12. Great Plains	- 4.60	- 3.43
13. Western Decalta	- 4.55	- 1.65
14. Canadian Homestead	- 4.50	-11.41
15. Supertest	- 4.50	13.88
16. Mill City	- 3.44	24.56
17. National	- 1.97	-12.57
18. Pacific	- 1.85	-11.42
19. Canadian Tricentrol	- 1.77	- 6.15
20. Charter	- 1.24	13.77
21. Gulf	- .81	- 8.78
22. Asamera	- .77	-13.50
23. Midcon	- .58	.86
24. New Continental	- .48	20.85
25. Okalta	.48	11.48
26. Spooner	.98	-40.37
27. Petrol	5.26	4.95
28. Triad	6.92	- 5.17
29. Consolidated West	12.83	- 5.26

expected tax change of -$12.20 and this figure divided by 15 per

cent, i, yields an expected change in value of -$81.35 for $100 of

Dome purchased at the average high low price of 1958. However,

for comparison purposes we require the change in value that would be

expected in $100 of a share held at the average high-low price of

November 7, 1969. Accordingly, the average high-low price of 1958

($10.66) was divided by the average high-low price on November 7,

1969 ($72.50) yielding a value of 9.147. This value was subsequently

multiplied by -$81.35 giving a value of -$11.97 which is the expected

change in value shown for Dome in Table 4-5.

The linear regression technique resulted in predictions

of future capital losses for five of the eighteen non-dividend

paying stocks. These were Consolidated West, Triad, Petrol, Okalta

and Spooner. Under existing legislation the holders of stocks would

not be subject to any tax or receive any deduction for the loss.

However, under the White Paper proposals these same shareholders

would be permitted a deduction of one-half the loss. These stocks

differ from the other non-dividend paying stocks only in that there

is a decrease rather than an increase in the shareholder's taxes

and accordingly an increase in the value of the shares.

The remaining eleven shares in the sample paid dividends.

An X in the dividend paid column of Table 4-4 signifies the dividend

payers. For the holders of these stocks the size of the tax bill

under existing legislation depends on the size of the dividend and

on the allowable shareholder depletion. Here again, since a linear

regression equation was employed to obtain estimates of dividends

the resulting increase in dividends is constant. Furthermore, since

the depletion allowance was assumed to be a constant percentage the

tax burden under existing legislation is a constant. For example,

if the dividends were one dollar, two dollars and three dollars

in years one, two and three respectively, a shareholder depletion

allowance of 10 per cent would yield taxable dividends of $.90,

$1.80 and $2.70 respectively, a constant increase of $.90. Then

the tax would be the taxable dividend times the marginal tax rate

(R) of 50 per cent minus the dividend tax credit (X) of 20 per cent

yielding tax of $.27, $.54 and $.81 for years one, two and three

respectively, a constant increase of $.27. Now, under the White

Paper proposals, the size of the dividend (D), the capital gain or

loss (C), available gross up (Z) and the marginal tax rate (R)

determine the amount of the tax burden. As an example, assume the

years one, two and three respectively have dividends of one dollar,

two dollars and three dollars, capital gains of one dollar, two

dollars and three dollars, available gross up of 50 per cent of

dividends and a marginal tax rate of 50 per cent. Then the tax

burden is: in the first year .5 [$1. + $.50 + (.5x$1.)] + $.50 =

$1.50; in the second year .5 [$2. + $1 + (.5x$2)] + $1. = $3.00;

and in the third year .5 [$3. + $1.50 + (.5x$3.)] + $1.50 = $4.50.

This yields a constant tax change from the existing legislation of

$1.23, $2.46 and $3.69 in years one, two and three respectively.

However, gross up could be less than one-half the dividend payout for

any of the dividend paying stocks in the sample. This would be the

case if the dividend payout was greater than one-half the tax per share

paid by the company. If this was the case the appropriate calculation

for gross up would be $(E_1 - E)/2$. As an example of this assume a

tax payment per share $(E_1 - E)$ of one dollar, two dollars and three dol

dollars in years one, two and three respectively. If dividends were

five dollars, ten dollars and fifteen dollars respectively, dividend

gross up soulw be fifty cents, one dollar and one dollar and fifty cents

respectively, a constant increase of fifty cents. This means that the

tax burden in the model would remain a constant. Therefore the formula

($\Delta T/i$) for the expected change in value when the tax change is a

constant can be applied in this case as well.

The results in Table 4-5 for the expected changes in value

were calculated according to the methods outlined in this section.

The stocks in the sample are arranged in the table beginning with

the largest expected devrease in value and ending with largest

expected increase in value for a stock holding valued at $100 on

November 7, 1969. It now remains to test these hypothetical results

against the actual change in stock values which actually occurred

following release of the White Paper. This is the subject of the

next section.

Tests On The Results

In order to test the hypothetical results they were

compared to the price changes which occurred during the period

November 7, 1969 to December 31, 1969. This particular period was

selected for a number of reasons. To begin with, for any change in

tax treatment there are several points in time when tax capital-
ization may occur. One point is when it becomes clear from political
activity that a change is forthcoming. With respect to the proposed
income tax changes this could involve various points, such as the
press releases of the Royal Commission On Taxation, the publishing
of the report of the Commission, the announcement that a White Paper
would be released and the actual release of the White Paper on
November 7, 1969. All signified a tax change, however, only one emanated
directly from the government and could be said to, more or less, commit
it. This was the publishing of the White Paper, Proposals For Tax
Reform, on November 7, from which the taxpayer could calculate the
amount of his change in tax. While the more astute taxpayer may have
been able to foresee the specific proposals, November 7, 1969 appears
as the most realistic date from which to begin an analysis of tax
capitalization, primarily because of taxpayers' inability to cal-
culate the precise amount of tax changes at any prior date. Other
points in time when income tax capitalization may occur such as when
the proposals become law have not occurred and therefore it is not
possible to test these. Another consideration in the selection of a
test period is its duration. Duration is relevant because the longer
the period employed in the test the more variables which can affect
the price. Bearing this in mind the test period was limited to the
period November 7, 1969 to December 31, 1969.

The test period selected, we now turn to a discussion of
the determination of the actual changes in price. The average of the
high-low stock prices on November 7 has been assumed to be what the

average of the high-low stock prices would have been on December 31,
in the absence of the White Paper. Furthermore, the price of each
stock held on November 7 was brought to the base 100 to provide
comparability between the stocks. In other words the stockholder
is assumed to hold $100 on November 7. Therefore the figures shown
in the actual change in value column of Table 4-5 is the percentage
change in the value in the test period. Now, since the calculated
changes in value reflect the change that would have been expected
by the holder of $100 of each share and the actual changes in value
reflect the actual change in value which occurred in $100 of the
stock held on November 7, the two columns are directly comparable.

If real world conditions corresponded to those assumed
in our model the changes in share values which actually occurred as
a result of the release of the White Paper would exactly equal the
calculated hypothetical $\triangle$ V values. This exact correspondence is
of course not to be expected. However the theory of tax capitali-
zation would be supported if the largest tax increases were found
to coincide with the largest decreases in value. Similarly, the
largest tax decreases should coincide with the largest increases in
value. However it can be seen from Table 4-5 that this did not occur.
For example: one of the largest expected tax increases (-11.47),
Dome Petroleum, has one of the greatest actual increases in value
(29.66). Furthermore, one of the largest expected tax decreases
(1.00), Spooner, had the greatest decrease in value (-40.37).

In view of this, tests were performed to determine whether
possibly tax increases consistently gave increases in value and

similarly whether tax decreases consistently gave decreases in value.
If such were the case negative tax capitalization would have been
found. To test this the sample was first divided into fifths, then
fourths, thirds and lastly into havles. The mean of each group was
calculated and the t values for the difference between means was
obtained from the formula:[15]

$$t = (\overline{X}_1 - \overline{X}_2) / s_{(x_1-x_2)}$$

where $\overline{X}_1$ and $\overline{X}_2$ are the means and $s_{(x_1-x_2)}$ is the standard error of
the difference between two means. The values obtained were then
compared with the tabulated values[16] for a two-tailed test but
most values were found insignificant at the higher levels of
significance. Overall, the most significant differences were found
when the stocks were divided into two groups:

	Mean	Calculated t	Level of Significance
Group 1	+1.62		
		-0.155	10%
Group 2	-1.91		

The conclusion to be drawn from this is that no evidence
was found to support the theory of tax capitalization. Empirical
evidence is insufficient to support a finding of either positive
or negative tax capitalization. Let us consider a number of possible
explanations for these findings.

One possible reason is that investors may be expecting
the White Paper proposals to be changed before they become law.
Both the name, Proposals For Tax Reform and statements made by the

Minister of Finance suggest they are proposals and are subject to alteration. If investors anticipated alterations to less discriminatory tax treatment of oil and gas shares in the final legislation, tax capitalization would not have occurred. Furthermore, one of the points in time at which tax capitalization may occur is when the legislation is enacted and investors in oil and gas stocks may be awaiting just such a time.

The fact that non-residents are affected to a minimal degree by the White Paper is another factor which may have prevented the observance of tax capitalization. United States residents, for one, already pay capital gains tax on share gains[17] and do not receive the benefit of dividend tax credit and will not receive the benefit of gross up.[18] While Canada proposes to tax the stock gains of non-residents, this only applies to non-residents who own more than 25 per cent of the stock of the Canadian company[19] and even this will not become effective until after 1974.[20] The taxing of capital gains by the Canadian government is presently prevented by many international tax agreements, only one of which is with the United States.[21]

Now why would this prevent observance of tax capitalization in the oil and gas stocks? These provisions coupled with the widespread foreign ownership of Canadian oil and gas stocks could combine to limit sharply the extent of tax capitalization resulting from tax changes affecting Canadian shareholders. In 1963 non-resident ownership of the Canadian petroleum and natural gas industry was 64 per cent and American ownership of the total was 54 per cent.[22]

Subsequently, because non-residents are minimally affected by the proposed changes they would have no reason to discount the tax increases and decreases which apply primarily to Canadian residents. Therefore, while Canadians may have been capitalizing the tax changes and selling their oil and gas shares, non-residents would not have any to captialize. Therefore, smaller decreases in price would result than if the stocks were held primarily by Canadians. Accordingly, tax capitalization would not be observed if conditions similar to those existing in 1963 were present during the test period. Ideally, evidence of non-resident purchases and holdings of oil and gas stocks during the test period should be analysed but these are unavailable.

Furthermore, investors in oil and gas stocks in the test period may have been relying on the market power of the major oil and gas companies to maintain the rate of return on oil and gas stocks by shifting the discriminatory tax burden either forward to consumers or backward to the factors of production. This would mean that investors were anticipating greater increases in future earnings than those predicted from historical data in this study. These expectations would lead to greater increases in actual price than those expected from using the capitalization model. If investors had such expectations tax capitalization would not have been evident.

In summary, this chapter has determined the values to be used in the capitalization model, applied the model, tested the results and provided suggestions as to why tax capitalization was not observed. It remains to provide a summary of the completed

study as well as the concluding remarks on the analysis, which is

the subject of the next chapter.

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CHAPTER V

SUMMARY AND CONCLUSION

Summary

This study was prompted by extensive public discussion of
the increased tax burden on oil and gas company shareholders
proposed in the White Paper Proposals For Tax Reform. In addition,
on examination of the present legislation and the proposed changes
suggested a decrease in the rate of return on oil and gas shares
because of the increased tax burden on these shareholders. This
conclusion was reached primarily as a result of the proposed gross
up and credit provision, the taxation of capital gains and the
removal of the shareholder depletion allowance. Accordingly it
was felt that this expected decrease in the rate of return could
have a depressing effect on the prices of the oil and gas stocks.

The theory of tax capitalization states that if tax
capitalization occurs an increase in the tax burden on an asset
or the income from that asset should result in a decrease in the
price of the asset, ceteris paribus. Similarly a decrease in the
tax burden on an asset or the income from that asset should result
in an increase in the price of the asset. It was felt that the
proposed increase in tax on the return from oil and gas company
stocks would provide a unique opportunity to test the theory of
tax capitalization. Accordingly, a model of tax capitalization

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was developed, designed to test for evidence of tax capitalization

in the prices of oil and gas stocks. The model provided estimates

of changes in price that would be expected as a result of the increased

tax on the return from oil and gas stocks. The expected changes in

price were then compared to the actual changes in price. Subsequently

a discussion was provided of the reasons why tax capitalization

was not observed in the test period.

Conclusion

The comparison of the theoretical price changes and the

actual price changes lead to the conclusion that the White Paper

did not cause any observable tax capitalization in the prices of

the twenty-nine oil and gas stocks, based on the historical data in

the sample. On the other hand, the t test for the significance of the

difference between means did not prove conclusively that negative

tax capitalization occurred. Therefore, it can only be stated that

tax capitalization was not observed in the sample in the test period,

November 7, 1969 to December 31, 1969.

Three reasons were advanced as possible explanations for

non-observance of tax capitalization in the test period. Share-

holders may have been anticipating less discriminatory changes in the

final legislation. Additionally the fact that non-residents are

unaffected by the White Paper proposals coupled with the high degree

of non-resident ownership of the oil and gas industry could have

decreased the observable tax capitalization. Furthermore investors

could have anticipated that the major oil and gas companies, through

their market power, would maintain the rate of return on oil and gas stocks through shifting of the tax increases either forward to consumers or backward to the factors of production thereby offsetting tax capitalization. For any or all of these reasons tax capitalization would not have been observed in the sample in the test period.

In summary income tax capitalization was not observed in the 29 oil and gas stocks comprising the sample in the test period and possible explanations are advanced for this finding.

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